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PATENT APPLICATION

A

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P. O. Box 272400
Fort Collins, Colorado 80528-9599

ATTORNEY DOCKET NO. 10960787-5

JC849 U.S. PTO
11/21/00

IN THE
U.S. PATENT AND TRADEMARK OFFICE

JC714 U.S. PTO
09/721409
11/21/00

Anticipated Classification of this application:

Class _____ Subclass _____

Prior application:

Examiner: _____

Art Unit: _____

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By Tiffany Turner

Typed Name: Tiffany Turner

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

REQUEST FOR A CONTINUING APPLICATION UNDER 37 CFR 1.53(b)

Sir:

This is a request for filing a continuing application under 37 CFR 1.53(b) a
☒ continuation application of:
☐ divisional application of:

Pending Prior Application

Application Serial No. 09/387,278 filed 8/31/99

Title Embedding Web Access Functionality into a Device for User Interface Functions

Name of applicant(s) C.Venkatraman, Jeffrey A, Morgan

Copy of Application

☒ Enclosed is a copy of the prior application, including the drawings.
☐ Enclosed is a new specification, including new drawings.

Oath or Declaration

☒ Enclosed is a copy of the prior Declaration (37 CFR 1.63(d)).
☐ Enclosed is a newly executed Declaration (original or copy).

Foreign Priority - 35 USC 119

☐ Foreign priority under 35 U.S.C. 119 has been claimed in prior application Serial No. _____
filed on _____ in _____
☐ The certified copy has been filed in prior application Serial No. _____
filed _____
☐ A separate paper claiming direct priority to a foreign application is enclosed herewith. A certified copy of the foreign application will be provided in due course.

Relate Back - 35 USC 120

☒ Amend the specification after the title by inserting the following heading:

--Cross Reference To Related Application(s)--;

and add the paragraph:

--This is a ☒ continuation ☐ divisional

of copending application serial number 09/387,278 filed on 8/31/99

**which is a continuation of patent application
serial number 08/740,289 filed on 10/25/96.**

Inventorship Statement

- () Delete the following named individuals as inventors in this application in accordance with 37 CFR 1.53(b) as a result of a change in the claimed subject matter:

Appointment of Associate Attorney

- () Recognize as Associate Attorney or Agent _____
Registration No. _____
() authorization is hereby granted by signature below of the Attorney or Agent of record
() the Associate Attorney or Agent shall not have the authority to appoint other Attorneys or Agents

Communications

- (X) Address all future communications to: Direct telephone calls to:

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Thomas X. Li
(650) 857-5972

Other Amendments

- (X) Before calculating the filing fee, amend the prior application as follows:
() Cancel the following claims _____ of the
prior application before calculating the filing fee. (At least one original independent claim must be
retained for filing purposes).
(X) Enter the enclosed Preliminary Amendment.

Fee Calculation

- (X) The filing fee is calculated below for (X) Utility () Design

CLAIMS AS FILED BY OTHER THAN A SMALL ENTITY				
(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) TOTALS
TOTAL CLAIMS	2 — 20	0	X \$18	\$ 0
INDEPENDENT CLAIMS	2 — 3	0	X \$78	\$ 0
ANY MULTIPLE DEPENDENT CLAIMS	0		\$260	\$ 0
BASIC FEE: Design \$310.00); Utility \$690.00)				\$ 690
TOTAL FILING FEE				\$ 690
TOTAL CHARGES TO DEPOSIT ACCOUNT				\$ 690

Charge \$ 690 to Deposit Account 08-2025. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16, 1.17, 1.19, 1.20 and 1.21. A duplicate copy of this transmittal letter is enclosed.

Respectfully submitted,

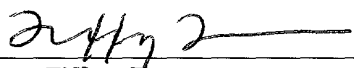
C.Venkatraman

By Thomas X. Li
Thomas X. Li
Attorney/Agent for Applicant(s)
Reg. No. 37,079

Date: 11/21/00

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Tiffany Turner

Date: November 21, 2000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

HP Docket No.: 10960787-5

Inventor(s): C. Venkatraman, et. al.

Group Art Unit:

Serial No.:

Examiner:

Filed: Herewith

Title: EMBEDDING WEB ACCESS FUNCTIONALITY INTO A
DEVICE FOR USER INTERFACE FUNCTIONS

Continuation Application of Application

Serial No.: 09/387,278

Filed: August 31, 1999

Continuation Application of Application

Serial No.: 08/740,289

Filed: October 25, 1996

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Sir:

Applicants respectfully request that the above-identified application be
further amended as follows.

IN THE CLAIMS

Cancel claims 1-32 without prejudice.

Add the following new claims.

33. A web access mechanism of a device, comprising:

a web server embedded in the device to generate a web page that provides a set of user interface functions for the device, wherein some of the user interface functions enable control functions of the device;

a network interface coupled to the web server to enable access to the web page by an external web browser;

a monitor coupled to the web server, wherein the monitor controls device-specific functions of the device and monitors a set of information pertaining to the device; and

a control/monitor path coupled to the monitor.

34. A device, comprising:

device specific hardware for providing at least a predetermined function, a network interface,


a web server, connected to the network interface and embedded in the device, to generate a web page that provides a set of user interface functions in response to a HTTP command received through the network interface, wherein some of the user interface functions enable the device specific hardware to perform the predetermined function;

a monitor coupled to the web server, wherein the monitor controls device-specific functions of the device and monitors a set of information pertaining to the device; and

a control/monitor path coupled to the monitor.

Respectfully submitted,

Chandrasekar Venkatraman, et al.

BY: 
Thomas X. Li

Reg. No. 37,079

Date: **November 21, 2000**

Tel. No.: **(650) 857-5972**

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Legal Department, M/S 20BN
P.O. Box 10301
Palo Alto, CA 94303-0890

0972409-13400

UNITED STATES PATENT APPLICATION FOR

EMBEDDING WEB ACCESS FUNCTIONALITY INTO
A DEVICE FOR USER INTERFACE
FUNCTIONS

Inventors:

Chandrasekar Venkatraman
Jeffrey A. Morgan

BACKGROUND OF THE INVENTION

Field of Invention

5 The present invention pertains to the field of
user interfaces for devices. More particularly, this
invention relates to embedding web access
functionality into devices to provide enhanced and
widely accessible user interface functions.

Art Background

10 A wide variety of devices including office
equipment, home-based equipment, and lab equipment,
as well as a variety of other types of devices
15 commonly provide device specific user interface
functions. Such devices may also be referred to as
gadgets. Office equipment includes, for example,
printers, fax machines, copiers, and various types of
communication and telephony devices. Home-based
20 devices include home entertainment equipment such as
televisions and video and audio players and recorders
as well as security systems, automobiles, appliances,
thermostats, and hot tubs. Lab equipment includes
measurement devices such as oscilloscopes, spectrum
25 analyzers and other types of measurement equipment as
well as networking equipment.

 The user-interface mechanisms of such devices
commonly include relatively simple and low cost user

input and display mechanisms. Such simple mechanisms may include, for example, light emitting elements such as LED/LCD elements as well as various types of simple input buttons or switches. Such simple mechanisms are typically constructed to be low cost to minimize the overall cost of such devices. In addition, such mechanisms are usually compact and enable relatively small sizes for such devices. Unfortunately, such simple user interface mechanisms severely limit the range and flexibility of the user interface functions provided by such devices.

The user-interface functions of such a device may be enhanced by the implementation of a screen-based user interface mechanism within the device. For example, such a device may include a display screen, and a rendering processor along with appropriate software for generating a rich graphical user interface suitable for the particular type of device. However, such screen displays and rendering mechanisms are usually expensive and increase the overall cost of the device. Such high costs are typically unsuitable for lower cost devices targeted for a relatively large mass market. Moreover, display screens and associated hardware may be too bulky for the size constraints of many devices.

A screen-based user interface may be provided for a device using an external computer system. For example, the device may be connected to the computer system through either a standard connection such as a serial or parallel port connection or through a specialized hardware interface. The external computer system usually executes a set of software for communication and user interface to the device. The external computer system may implement a screen-based user interface for the device. The external computer system may also execute web server software that enables external web browsers to access the computer system and in turn the user interface of the device.

Unfortunately, such an external computer system greatly increases the cost of providing a screen-base user interface for a device. In addition, such prior computer system based solutions usually require the development of specialized software for each particular type of device. Moreover, such specialized software for a particular device from a particular manufacturer must typically be developed for differing types of computer system platforms. Such a variety of differing software for differing platforms greatly complicates the task of providing support for the devices. Furthermore, the development and support costs of such a variety of

software usually increase the overall cost of providing a screen based user interface for such devices.

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SUMMARY OF THE INVENTION

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5 A solution for providing widely accessible, low cost, and enhanced user interface functions for a device is disclosed. The solution involves embedding web access functionality into the device including a web server that provides a device web page. The device includes an embedded network interface that enables access to the device web page by a web

10 browser. A user of the web browser accesses the user interface functions for the device through the device web page. The web server functionality may be implemented with existing circuitry in a device, such as an exiting processor, memory, and input/output

15 circuitry that normally perform device-specific functions, thereby avoiding the extra cost and space required for dedicated web server hardware for the device.

20 The web server functionality embedded in the device enables device user interface access via a variety of communication mechanisms including the world wide web portion of the Internet. The costs of providing screen based user interface mechanisms are

25 exported away from the device and do not require an external computer to provide a device web server. The methods and mechanisms disclosed herein provide screen based user-friendly interfaces to a wide

variety of devices without the necessity to develop
expensive hardware and software applications for
differing devices. The present methods and
mechanisms employ web technology so that access to a
5 device user interface is independent of the computer
system platform employed and independent of the web
browser software executed and independent of the
location of the user.

10 The user interface information is packaged using
the Hyper-Text Markup Language (HTML) and is
transported according to the Hyper-Text Transfer
Protocol (HTTP). The HTML and HTTP protocols enable
communication with existing web browsers independent
15 of the platform that executes the web browser. The
present techniques avoid the need of an industry-wide
Application Programming Interface (API) to unify the
control and use of equipment.

20 Other features and advantages of the present
invention will be apparent from the detailed
description that follows.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is described with respect to particular exemplary embodiments thereof and reference is accordingly made to the drawings in which:

Figures 1a-1b illustrate a device with embedded web access functionality that provides device-specific user interface functions through a device web page;

Figure 2 shows a home-based network that enables a web browser to access the user interface functions through the device web page;

Figure 3 illustrates an example device web page for a printer device;

Figure 4 shows a large organization network or intranet that enables access to the device web pages of differing devices;

Figure 5 illustrates access to device web pages through the Internet world-wide web.

DETAILED DESCRIPTION

Figure 1a illustrates a device 10 with embedded web access functionality that provides device-specific user interface functions. The device 10 includes a network interface 12 and a web server 14 along with a monitor 16. The network interface 12 enables communication via a communication path 22. The monitor 16 controls various device-specific functions of the device 10 and monitors a set of information pertaining to the device 10 via a control/monitor path 20. The web server 14 provides web server functions to web clients via the communication path 22. The web server 14 provides web server functions according to the Hyper-Text Transfer Protocol (HTTP).

The web server 14 receives HTTP commands through the network interface 12 that specify a predetermined Universal Resource Locator (URL) for the device 10. The HTTP commands may be used by web clients to read information from the device 10 such as device status information. The HTTP commands may also be used to transfer information to the device 10 such as information that controls the functions or operating states of the device 10. Such HTTP commands include HTTP GET, HTTP POST, and HTTP PUT commands.

In response to an HTTP command targeted for the device 10, the web server 14 generates a web page 18 that defines a set of user interface functions for the device 10. The web page 18 is a Hypertext Markup Language (HTML) file. The network interface 12 transfers the web page 18 to a requesting HTTP client via the communication path 22.

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The web server 14 generates the web page 18 dynamically to reflect the updated state of the information pertaining to the device 10 that is maintained by the monitor 16. The web page 18 may also define control buttons according to the HTTP protocol that enable various control functions for the device 10 to be initiated from a web client via the communication path 22. The web page 18 may contain text, images, multimedia files, forms, tables or any object type supported by the HTTP and HTML protocols.

20

In addition, the web page 18 may contain one or more URLs that specify additional web pages located within the device 10. The web page 18 may also contain one or more URLs that specify additional web pages located elsewhere, i.e. external to the device 10. The additional web pages external to the device 10 may be located, for example, on a local

25

communication network or on the Internet world wide web.

5 The device 10 represents a wide variety of
devices including devices such as printers, fax
machines, copiers, communication and telephony
devices, home entertainment devices such as
televisions, video and audio devices as well as
appliances such as refrigerators and washing
10 machines, security systems, automobiles, and hot
tubs. The device 10 also represents a variety of
measurement instruments including oscilloscopes, and
spectrum analyzers and other types of measurement
devices. In addition, the device 10 represents a
15 variety of computer peripheral devices including mass
storage units such as rotating media storage units.

20 The communication path 22 represents any
communication means that is capable of transferring
HTML files according to the HTTP web protocol. The
communication path 22 may be realized by a wide
variety of communication mechanisms including local
area networks, telephone lines including cellular
telephone links, serial communication links, parallel
25 communication links, power line communication links,
and radio and infrared communication links. The
communication path 22 may also be a direct Internet
connection to the world-wide web.

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Figure 1b is a hardware block diagram of the device 10. The device 10 includes a processor 200, a memory 210, a set of device-specific hardware 300 along with a set of input/output circuitry 220 that enables communication via the communication path 22. The processor 200 performs device-specific functions for the device 10 in combination with the device-specific hardware 300. The processor 200 is also employed to provide web server functionality in the device 10. In one embodiment, the processor 200 stores the web page 18 in the memory 210 which may also be used to store information associated with normal device-specific functions.

In one embodiment, the device 10 is a printer device wherein the processor 200 and the memory 210 preform image rendering functions and the device-specific hardware 300 includes printer hardware and associated circuitry and wherein the input/output circuitry 220 provides network access to the printer device 10. The web server functionality is embedded into the printer device 10 by providing software or firmware for the processor 200 and by utilizing space available in the memory 210 and by using the existing input/output circuitry 220 such as Ethernet circuitry to transfer HTML files.

In another embodiment, the device 10 is a video player/recorder wherein the processor 200 and the memory 210 perform functions for reading video and audio information from and writing video and audio information to a storage media such as magnetic tape or an optical storage media. The device-specific hardware 300 includes media actuation hardware such as motors and magnetic heads and associated circuitry for reading and imparting information onto the storage media. The web server functionality is embedded into the video device 10 by providing software or firmware for the processor 200 and by utilizing space available in the memory 210 and by adding the input/output circuitry 220 to the video device 10.

In yet another embodiment, the device 10 is a washing machine wherein the processor 200 and the memory 210 perform functions for controlling wash cycles. The device-specific hardware 300 includes hardware such as motors, valves, sensors, and associated circuitry. The web server functionality is embedded into the washing machine 10 by providing software or firmware for the processor 200 and by utilizing space available in the memory 210 and by adding the input/output circuitry to the video device 10.

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The web server functionality for the device 10 includes software executed by the processor 200 that services the HTTP protocol and that generates HTML formatted files. The web page 18 in one embodiment is stored in the memory 210 or may be generated on the fly. The processor 200 also executes communication software that drives the input/output circuitry 220 and provides the functionality of the network interface 12. In addition, the processor 200 executes software that performs control and information monitoring and logging functions of the monitor 16.

In another embodiment, the web server functions of the device 10 are implemented on a single integrated circuit chip including a processor and memory for holding software for servicing the HTTP protocol. In such an embodiment, the hardware portion of the network interface 12 may be implemented on the same integrated circuit chip as the processor or may be external to that chip.

In yet another embodiment, the web server functions of the device 10 are implemented with a state machine.

In another embodiment, the device 10 is a controller module or control computer contained in an

automobile. The input/output circuitry 220 such as cellular transmitter/receiver circuitry enables a web browser to access control and status information for the automobile which is contained in the web page 18.

5

In another embodiment, the device 10 is a mass storage device such as a disk drive or CD-ROM drive. The input/output circuitry 220 such as local area network interface circuitry enables a web browser to access control and status information for the mass storage device which is contained in the web page 18.

10

In yet another embodiment, the device 10 is a home-entertainment device such as an audio system. The input/output circuitry 220 such as infrared communication circuitry or power line communication circuitry enables a web browser such as a home computer to access control and status information for the audio system which is contained in the web page 18.

15

20

The memory 210 may be a static memory such as read-only memory, a flash memory, or a disk drive or may be a volatile memory such as a random access memory. The web page may be stored in the static memory or the random access memory in the HTML format or may be generated on the fly without being stored in the device 10.

25

Figure 2 shows a home-based network 30 that enables a web browser 40 to access the user interface functions of the device 10. The home-based network 30 may be implemented with a variety of communication mechanisms suitable for a home including power line communication links, twisted pair communication links, radio frequency communication links, and infrared communication links.

The web browser 40 includes a display 42 for generating visual objects including text, images, multimedia objects, and graphical user interface objects. The web browser 40 includes a selection device 44 that enables a user to select objects and URL links rendered on the display 42. The web browser 40 may also include an audio capability that enables rendering of audio information to the user.

The home-based network 30 may also enable communication among a set of devices 50-52. The devices 50-52 may include devices such as home appliances, home security systems, home entertainment devices, air-conditioning systems and hot-tubs. Any of the devices 50-52 that implement the device web page mechanisms disclosed herein may provide device specific user interface web pages to the web browser 40 via the home-based network 30.

The web browser 40 may be embodied in a computer system that executes a set of web browser software. Such a computer system with web browser functionality may be realized by any one of a variety of available computer system platforms including Windows platforms, Macintosh platforms, Unix platforms as well as any other platform capable of executing web browser software that provides HTTP client functions and that renders HTML files.

The web browser 40 may also be embodied in a variety of other devices that provide HTTP client functions and that render HTML files. Such devices include specialized hardware designed for television or telephone systems as well as low cost web browser devices and network computers.

A user accesses and controls the user interface functions of the device 10 using the web browser 40. The user enters a URL corresponding to the device 10 into the web browser 40. In response, the web browser 40 transfers an HTTP command which includes the entered URL over the home-based network 30. The device 10 receives the HTTP command via the communication path 22 and recognizes the URL contained therein.

In one embodiment, the information for the web page 18 is periodically updated by the processor 200 and is stored in HTML format in the memory 210. In such an embodiment, the processor 200 reads the web page 18 from the memory 210 in response to the HTTP command and transfers the web page 18 to the web browser 40 via the home based network 30.

In an alternative embodiment, the processor 200 generates the web page 18 on the fly in response to the HTTP command from the web browser 40. In such an embodiment, the processor 200 obtains information pertaining to the device from the device-specific hardware 300 after receiving the HTTP command and recognizing the URL contained therein. The processor 200 formats the information into the HTML format that defines the web page 18 and transfers the HTML formatted information to the web browser 40 via the home based network 30.

20

The HTML file is transferred according to the HTTP protocol which specifies the URL corresponding to the web browser 40. The web browser 40 receives the HTML file and renders the web page 18 on the display 42.

25

The following is an example HTML file that defines the web page 18 in an embodiment wherein the device 10 is a printer device.

5 <TITLE>Printer Home Page</TITLE>
 <H1>home page for device 10</H1>
 <HR>
 The following information pertains to
 the device 10 which in this example
10 is a printer
 <table border>
 <caption> Printer with a URL </caption>
 <TR>
 <TD>Printer Name</TD>Portdv9</TD>
15 </TR>
 <TR>
 <TD>Administrator</TD><TD>Mr. John Doe</TD>
 </TR>
 <TR>
20 <TD>Location</TD><TD>Building 1U</TD>
 </TR>
 </TABLE>
 <P>
 Service Contract
25 <P>
 Supplies
 ordering
 <P>
 Future
30 Products
 <P>
 <HR>

35 **Figure 3** illustrates the web page 18 for the
 example HTML file shown above wherein the device 10
 is a printer. The web page 18 is rendered on the
 display 42 by the web browser 40 in response to the
 example HTML code set forth above. The web page 18

includes a page title 70, a header section 60, a set of ASCII text 62, a table section 64, and a set of hyperlinks 66-68.

5 The page title 70 is defined by the HTML
 <TITLE>Printer Home Page</TITLE> coding shown above.
 The header section 60 is defined by the HTML code
 <H1>Home Page for device 10</H1> in the HTML file
 shown above. The ASCII text 62 is the ASCII text
10 contained in the HTML file shown above. The table
 section 64 is defined with coding in the HTML file
 shown above and provides information pertaining to
 the printer including a printer name, an
 administrator, and a location for the printer.

15 The hyperlinks 66-68 defined in the HTML file
 shown above direct the web browser 40 to other web
 pages for various printer support functions. For
 example, the hyperlink 66 "Service Contract" may be
20 selected by the user with the selection device 44 to
 direct the web browser 40 to the URL
 "http://www.hpssc.com" for information regarding
 printer service contracts. Similarly, hyperlinks 67
 and 68 provide links to web pages for ordering
25 printer supplies and obtaining information for future
 printer products from the manufacturer of the printer
 device 10.

The web page 18 for the printer may also include manuals, parts lists, and other associated publications. These publication may be stored within the device 10 in, for example, a nonvolatile memory, or may be referenced elsewhere via hyperlinks contained in the web page 18. These publications contain dynamic information such as updated manuals as well as new and updated software driver routines for the device 10.

10

Figure 4 shows a large organization network 80 that enables access to the device web pages of the device 10 and the devices 50-52. The large organization network 80 may be referred to as an Intranet and may be implemented with a variety of communication mechanisms including local area networks connected together by various types of communication links.

15

20

Any one or more of a set of computer systems 90-92 coupled to the large organization network 80 may access the device web pages of the devices 10 and 50-52. The computer systems 90-92 may execute one or more of a variety of available web browser software or may have web browser functions built in.

25

A user of one of the computer systems 90-92 enters a URL corresponding to the desired one of the

devices 10 and 50-52 into the corresponding web browser application. In response, the particular web browser application as an HTTP client transfers an HTTP command that specifies the desired URL over the large organization network 80. The device specified by the HTTP command recognizes the URL contained therein. In response, the targeted device transfers an HTML file that defines its device web page via large organization network 80. The transfer of the HTML file specifies the URL of the originating HTTP client computer system from among the computer systems 90-92. The originating HTTP client computer system recognizes its URL and receives and then renders the device web page to the user.

Figure 5 illustrates access to device web pages through a direct Internet connection to the world-wide web 100. The web page 18 of the device 10 may be accessed by any web client on the world-wide web 100 including the web browser 40.

In addition, a communication system 102 functions as a communication bridge between the world-wide web 100 and a local area network 120 and a communication system 104 functions as a communication bridge between the world-wide web 100 and a home base network 130. As a consequence, any other HTTP clients coupled to the local area network 120 or the

home-base network 130 may access the device web pages
in a device 108, a device 106, or the device 10. In
addition, the web browser 40 or any HTTP client on
the world-wide web 100 may access the device web
5 pages of the devices 106 and 108.

The embedded web server functionality described
herein enables a variety of widely accessible device
interrogation and control functions for a particular
10 device as well as for sets of devices. For example,
a web page may be embedded into each washing machine
of a chain of Laundromats wherein an operator from an
office computer can determine the machines that
require servicing and schedule daily service routing
15 to the Laundromats accordingly.

The foregoing detailed description of the
present invention is provided for the purposes of
illustration and is not intended to be exhaustive or
20 to limit the invention to the precise embodiment
disclosed. Accordingly, the scope of the present
invention is defined by the appended claims.

CLAIMS

What is claimed is:

- 5 1. A web access mechanism embedded in a device,
comprising:

web server that generates a device web page
wherein the device web page provides a set of user
interface functions for the device;

- 10 network interface that enables access to the
device web page by a web browser such that a user of
the web browser accesses the user interface functions
for the device through the device web page.

- 15 2. The web access mechanism of claim 1, wherein the
web server receives an HTTP command via the network
interface and then generates an HTML file that
defines the device web page in response to the HTTP
command.

- 20 3. The web access mechanism of claim 2, wherein the
HTTP command specifies a URL corresponding to the
device.

- 25 4. The web access mechanism of claim 3, wherein the
HTML file contains a set of information pertaining to
the device.

5. The web access mechanism of claim 3, wherein the HTML file contains a set of URLs that control a set of predetermined functions for the device wherein each URL may point to a web page located internal to the device or a web page located external to the device.

6. The web access mechanism of claim 3, wherein the HTML file contains a hyperlink to an external web page that specifies additional information pertaining to the device.

7. A device, comprising:

processor that generates a device web page wherein the device web page provides a set of user interface functions for the device and includes a set of information pertaining to the device;

memory for storing the device web page;

input/output circuitry that enables

communication via a communication path such that a web browser accesses the device web page via the communication path.

8. The device of claim 7, wherein the processor receives an HTTP command via the input/output circuitry and then generates an HTML file that defines the device web page in response to the HTTP command.

9. The device of claim 8, wherein the HTTP command specifies a URL corresponding to the device.

5 10. The device of claim 8, wherein the HTML file contains a set of URLs that control a set of predetermined functions for the device wherein each URL may point to a web page located internal to the device or a web page located external to the device.

10 11. The device of claim 8, wherein the HTML file defines a set of graphical mechanisms for controlling a set of predetermined functions for the device.

15 12. The device of claim 8, wherein the HTML file contains a hyperlink to an external web page that specifies additional information pertaining to the device.

20 13. A user interface method for a device, comprising the steps of:

generating a device web page within the device wherein the device web page provides a set of user interface functions for the device;

25 providing access to the device web page from a web browser external to the device such that a user of the web browser accesses the user interface functions for the device through the device web page.

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14. The method of claim 13, wherein the step of
generating a device web page includes the step of
generating an HTML file that defines the device web
page in response to an HTTP command received from the
web browser.

15. The method of claim 14, wherein the HTTP command
specifies a URL corresponding to the device.

16. The method of claim 14, wherein the HTML file
contains a set of information pertaining to the
device.

17. The method of claim 14, wherein the HTML file
contains a set of URLs that control a set of
predetermined functions for the device wherein each
URL may point to a web page located internal to the
device or a web page located external to the device.

18. The method of claim 14, wherein the HTML file
contains a hyperlink to an external web page that
specifies additional information pertaining to the
device.

19. A user interface apparatus embedded in a device,
comprising:

means for generating a device web page within the device wherein the device web page provides a set of user interface functions for the device;

means for providing access to the device web page from a web browser external to the device such that a user of the web browser accesses the user interface functions for the device through the device web page.

20. The apparatus of claim 19, wherein the means for generating a device web page includes means for generating an HTML file that defines the device web page in response to an HTTP command generated by the web browser.

21. The apparatus of claim 20, wherein the HTTP command specifies a URL corresponding to the device.

22. The apparatus of claim 20, wherein the HTML file contains a set of information pertaining to the device.

23. The apparatus of claim 20, wherein the HTML file contains a set of URLs that control a set of predetermined functions for the device wherein each URL may point to a web page located internal to the device or a web page located external to the device.

24. The apparatus of claim 20, wherein the HTML file contains a hyperlink to an external web page that specifies additional information pertaining to the device.

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25. A system, comprising:

device having an embedded web server that generates a device web page wherein the device web page provides a set of user interface functions for the device and includes a set of information pertaining to the device, the device also having a network interface that enables access to the device web page via a communication network;

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web browser coupled to the communication network wherein a user of the web browser accesses the user interface functions for the device through the device web page.

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26. The system of claim 25, wherein the web server in the device receives an HTTP command via the communication network and the network interface and then generates an HTML file that defines the device web page in response to the HTTP command.

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27. The system of claim 26, wherein the HTTP command specifies a URL corresponding to the device.

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28. The system of claim 26, wherein the HTML file contains a set of URLs that control a set of predetermined functions for the device such that the user of the web browser selects the URLs to control the predetermined functions of the device wherein each URL may point to a web page located internal to the device or a web page located external to the device.

29. The system of claim 26, wherein the HTML file contains a hyperlink to an external web page located elsewhere on the communication network that specifies additional information pertaining to the device.

30. The system of claim 25, wherein the communication network comprises a home-based communication network.

31. The system of claim 25, wherein the communication network comprises a large-organization communication network.

32. The system of claim 25, wherein the communication network comprises the world wide web of the Internet.

ABSTRACT

Web access functionality is embedded in a device
to enable low cost widely accessible and enhanced
user interface functions for the device. A web
5 server in the device provides access to the user
interface functions for the device through a device
web page. A network interface in the device enables
access to the web page by a web browser such that a
user of the web browser accesses the user interface
10 functions for the device through the web page.

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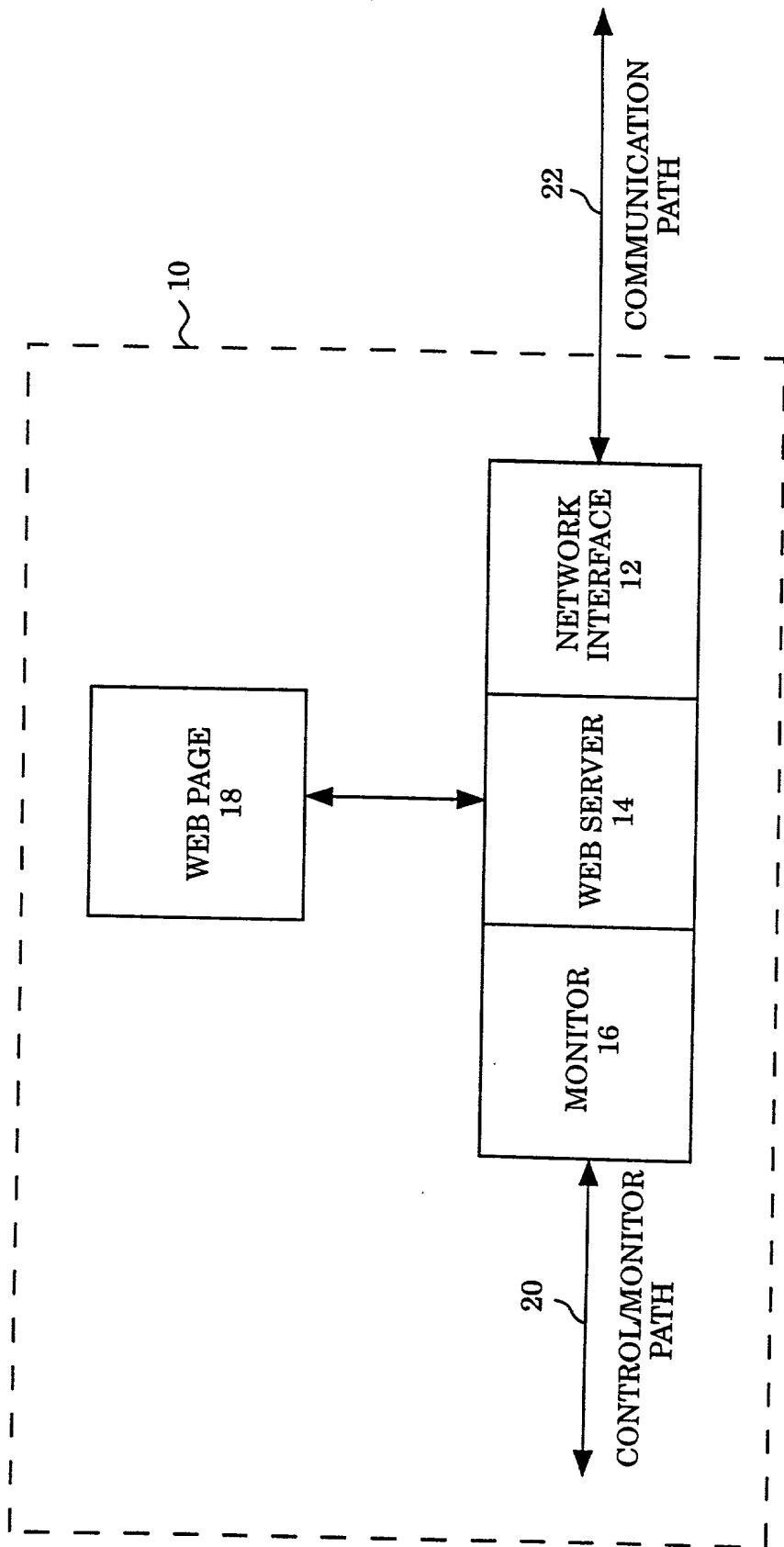
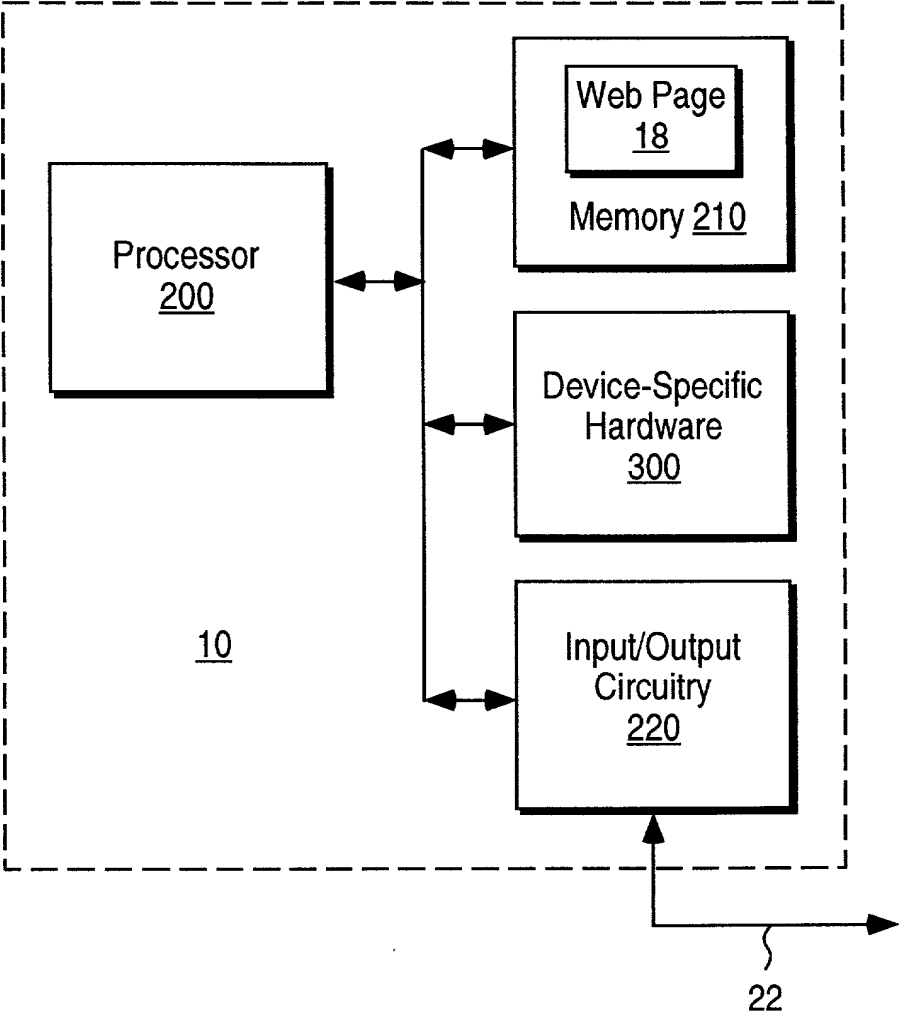
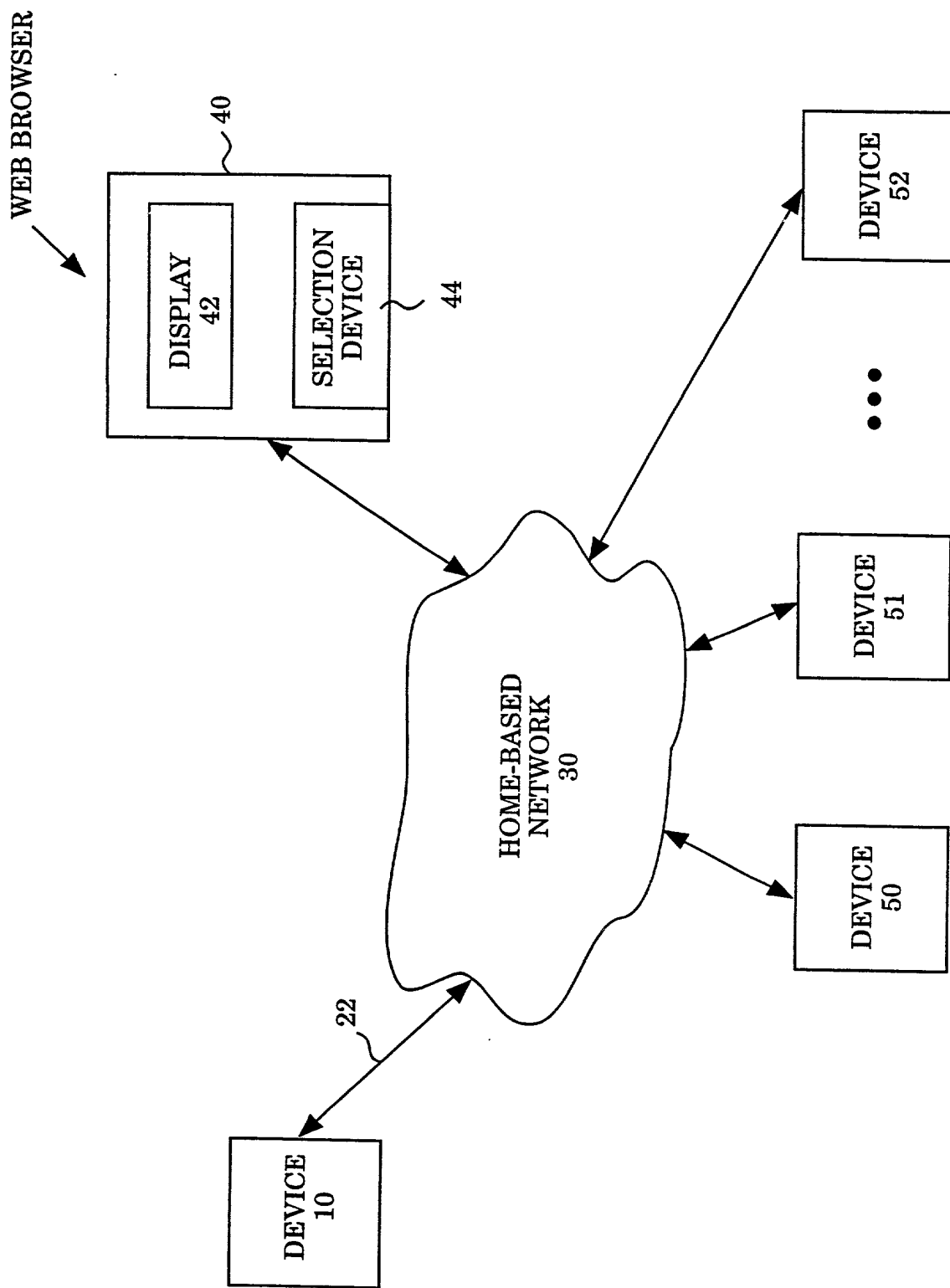


Figure 1a

FIG. 1B





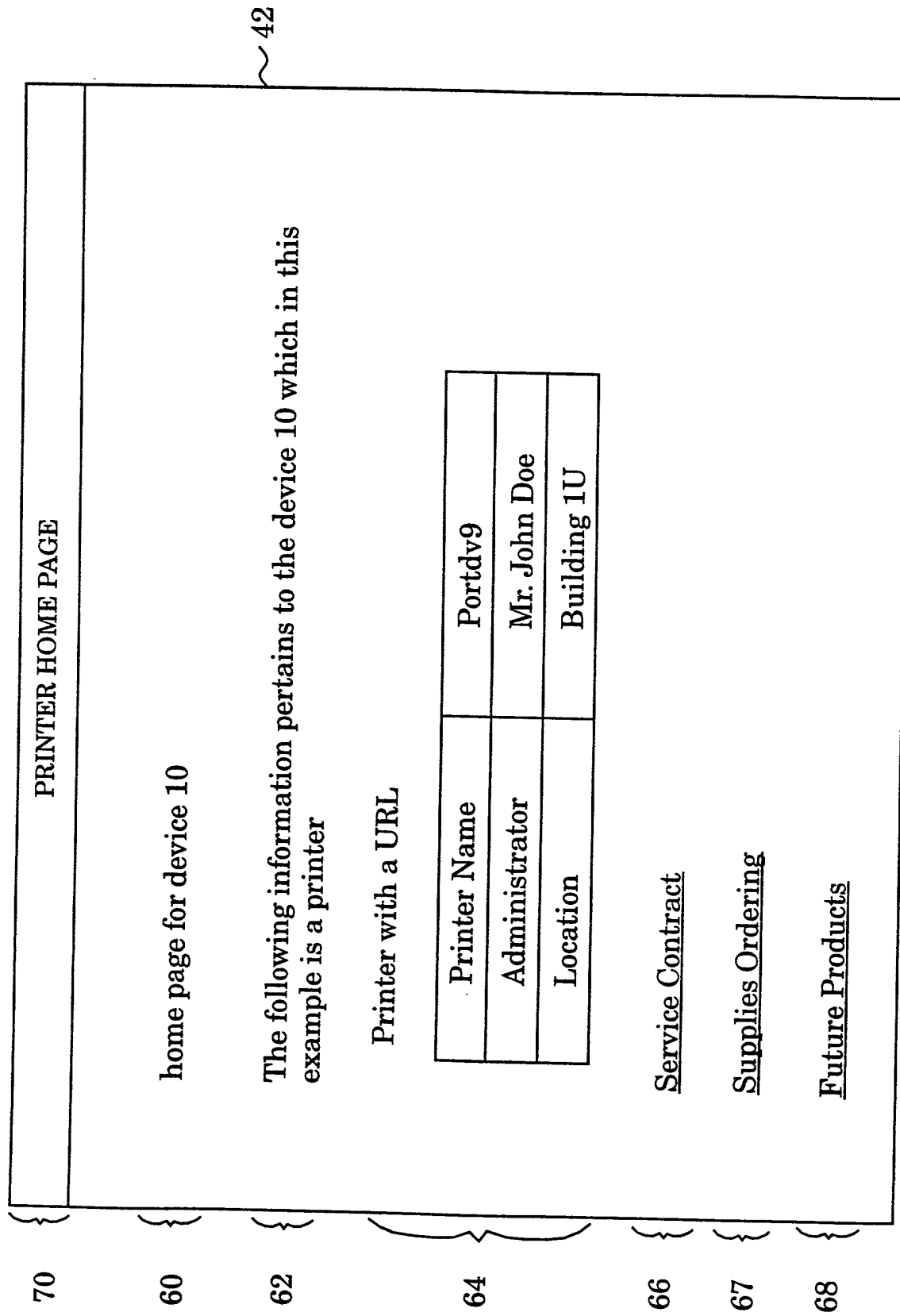


Figure 3

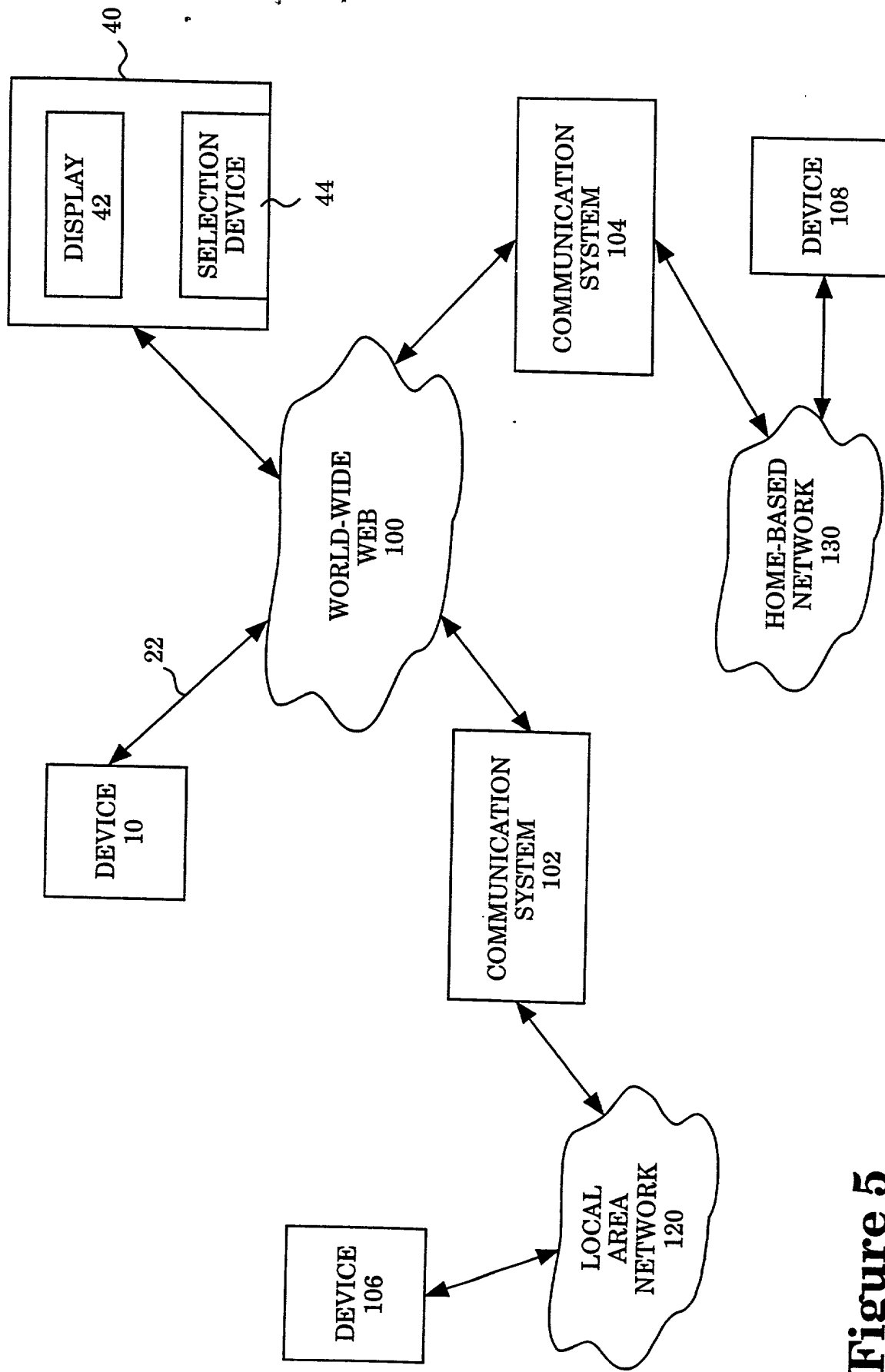


Figure 5

DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION

ATTORNEY DOCKET NO. 10960787

As a below named inventor, I hereby declare that:

My residence/post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

EMBEDDING WEB ACCESS FUNCTIONALITY INTO A DEVICE FOR USER INTERFACE FUNCTIONS

the specification of which is attached hereto unless the following box is checked:

() was filed on _____ as US Application Serial No. or PCT International Application
Number _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understood the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose all information which is material to patentability as defined in 37 CFR 1.56.

Foreign Application(s) and/or Claim of Foreign Priority

I hereby claim foreign priority benefits under Title 35, United States Code Section 119 of any foreign application(s) for patent or inventor(s) certificate listed below and have also identified below any foreign application for patent or inventor(s) certificate having a filing date before that of the application on which priority is claimed:

COUNTRY	APPLICATION NUMBER	DATE FILED	PRIORITY CLAIMED UNDER 35 U.S.C. 119
			YES: _____ NO: _____
			YES: _____ NO: _____

Provisional Application

I hereby claim the benefit under Title 35, United States Code Section 119(e) of any United States provisional application(s) listed below:

APPLICATION SERIAL NUMBER	FILING DATE

U. S. Priority Claim

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION SERIAL NUMBER	FILING DATE	STATUS (patented/pending/abandoned)

POWER OF ATTORNEY:

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) listed below to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's Signature

Date

Oct 25 '96

**DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION (continued)**

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Residence: _____
Post Office Address: _____
Inventor's Signature: _____ Date: _____

Full Name of # 4 joint inventor: _____ Citizenship: _____
Residence: _____
Post Office Address: _____
Inventor's Signature: _____ Date: _____

Full Name of # 5 joint inventor: _____ Citizenship: _____
Residence: _____
Post Office Address: _____
Inventor's Signature: _____ Date: _____

Full Name of # 6 joint inventor: _____ Citizenship: _____
Residence: _____
Post Office Address: _____
Inventor's Signature: _____ Date: _____

Full Name of # 7 joint inventor: _____ Citizenship: _____
Residence: _____
Post Office Address: _____
Inventor's Signature: _____ Date: _____

Full Name of # 8 joint inventor: _____ Citizenship: _____
Residence: _____
Post Office Address: _____
Inventor's Signature: _____ Date: _____